

COOPERATIVE FOREST PEST ACTION PROGRAM

Alan R. Miller

Annual Summary F. Y. 1976

The Cooperative Forest Pest Action Program serves the population of West Virginia and cooperates with the Forestry Division of the West Virginia Department of Natural Resources and operates through a formal agreement with the United States Forest Service. Insect and disease detection surveys and control of insect and diseases when needed are the primary functions of the program.

In F. Y. 1976 no control programs were necessary except for the continuing control of Oak Wilt and the ribes eradication in the White Pine Blister Rust Program.

The Gypsy Moth survey recovered 12 male moths in Eastern West Virginia. The catches were in Jefferson (6 males), Berkeley (4 males), and Morgan (2 males). All male moth finds were in traps set by Federal and State persons employed to set and maintain traps. Subsequent ground checking and aerial surveys in the area of the male moth recoveries did not indicate any infestation by the Gypsy Moth. Burlap banding of trees in the male moth catch sites is continuing and no larvae, pupae or eggs have been found. One mobile home was found infested in St. Albans and all the egg masses were removed. The trailer was sprayed with Sevin at weekly intervals to kill larvae that may have hatched from unseen egg masses.

The Oak Sawfly Caliroa quercuscoccineae is causing considerable damage to the red oaks in southern W. Va. and much work has been carried out to plan for a spray program in July 1976.

Jan Hacker assisted very much in this endeavor and we were able to find and count pre-pupae, adults, and eggs all complying with certain standard surveys.

Plans were made and finalized to spray July 8, 1976, at Pipestem State Park, but Thompson Hayward had failed to obtain an experimental use permit and all plans were cancelled. This, however, did not mean an end to the observations and sampling techniques which will continue. A report of all findings are on file in the Division. Tentative plans call for a spray program with Dimilin again in August when the second generation of the insect is doing damage. Approximately 42,000 acres were defoliated by this insect in Southern W. Va. during F. Y. 1976.

A pheromone trapping program was employed to catch clear wing moths (clear wing borers) at various sites in W. Va. The sites were selected to catch certain borers ie. peach tree borer (peach orchard), Maple callus borer (a stand of Maple trees), Dogwood borer in an area where many dogwoods were growing, etc. A report of this trapping program is on file in the Division and can also be found in the annual summary.

The final report of all findings in the Thuricide 16B spray program was prepared and is on file in the Division and included in the Forest Insect and Disease Annual Summary. Generally speaking, the Thuricide 16B controlled 50% of the larvae in the test plots.

Observation plots were established in the Red Pine plantings at Davis to determine cause of the girdling which takes place about 15 feet above the ground. The findings to date show that the red squirrel (fairy diddle or piney squirrel) is causing the damage. The plot trees will remain and be checked for possible insect or diseases that may enter these wounds and cause ultimate death to the trees.

Problems were encountered with a ^{shoot} ~~shot~~ moth causing much damage to Scotch, Red and Virginia pine seedlings in the Lakin State Tree Nursery. A summer employee, Tom Mason, is working with WVU on controlling the insects in the nursery beds with

different chemicals. Results should be available in 1976.

Surveys for the fall cankerworm indicated there would be no infestations by this insect.

During fiscal year 1976 the Forest Entomologist presented 43 talks which included girl scouts, boy scouts, garden clubs, schools, TV and radio talks. The forest entomologist answered 242 pest identification samples and answered 305 telephone calls.

During fiscal year 1976 James Brooks, the Forest Pathologist, resigned and accepted employment with the State of Minnesota.

Nancy Taylor is assuming the duties until a Forest Pathologist can be employed.

A fire damage project was initiated during F. Y. 1976. This involved a study of fire and the resulting discoloration and decay in standing timber, the establishment of cull and cutting guidelines based on wound size and other physically apparent features of hardwood trees, and the development of an educational program concerning damage to standing timber caused by fire. This project is not completed. The work was done with the close cooperation of the Department of Natural Resources.

A black cherry management program was initiated in cooperation with Dr. William MacDonald at WVU.

Oak anthracnose (Gnomonia veneta) and a small leaf spot (Actinopelte dryina) occurring together resulted in defoliation of oaks in the southwest part of the state during the 1975 season.

Dutch elm disease caused by Ceratocystis ulmi was a problem during 1975 and continued to be a problem during 1976.

A needlecast of spruce caused by Rhizosphaera kalkhoffii developed late in 1975. There are some indications that it may occur again this year.

Verticillium wilt of hardwoods, especially maple, continues to show up from time to time. This is caused by Verticillium albo-atrum.

American chestnut work involved the collection and storage of seeds of both American chestnut and chinquapins. Some seed was germinated in the laboratory. An article on this work appeared in "Wonderful West Virginia" and drew a gratifying response.

The suspected causal agent of white pine root decline, Verticicladiella procera, was isolated.

WHITE PINE BLISTER RUST CONTROL

Report of Alan J. Miller

In the natural range of white pine in W. Va. the disease known as White Pine Blister Rust *Cronartium ribicola* occurs and has the potential of killing a large percentage of the valuable white pine. The control procedure is to eliminate the (Ribes sp) bush, which is the alternate host of the disease, from among and near White Pine. In fiscal year 1976 there were 9,317 Ribes bushes destroyed on 1300 acres that met the MARTY evaluation studies. The total acres surveyed was 55,443. This area surveyed included presuppression survey to determine the status of the control area and acres needing work, mapping, etc. Post control evaluation to determine the results of suppression work, pine area evaluation to determine the cost benefit ratio, and detection survey to determine the general distribution of blister rust in the control area.

A total of 16,000 acres were placed in a 'no further work" category as a result of the surveys.

Most of the valuable white pine acreage is now on a maintenance basis, which means that control work has been done and only periodic re-examination is needed.

Status of State and Private Land in W. Va.

White Pine	Control Area	Not on Maintenance	On Maintenance	No Further Work
226,826	413,165	2,930	410,235	208,523

Status of Federal Forest Land in W. Va.

White Pine	Control Area	Not on Maintenance	On Maintenance	No Further Work
86,920	144,903	- 0 -	144,903	- 0 -

OAK WILT DETECTION AND CONTROL

Report of Alan R. Miller

The fungus Ceratocystis fagacearum causes a disease of oaks known as Oak Wilt. This disease is considered a potential threat to West Virginia's oaks. Consequently control efforts continue along with pilot tests of possible new control methods.

In F. Y. 1976 there were 1,748 diseased trees in 1,198 infection centers. This number is 363 trees less than last year, and 370 decrease in infection centers. However, this does not mean or indicate a decrease in the disease but is probably the result of decreased field activities in certain areas of the state.

A total of 2,277 man days were worked on the ground and 1,634 hours and 52 minutes were flown on aerial survey.

The United States Forest Service is carrying out a pilot project for the tree injection method of applying Cacodylic acid for control of Oak Wilt. The project encompasses the Hanging Rock, Moorefield, Elk Garden and Greenland Gap quadrangles.

Independent of this project, evaluation of seven other chemicals is being tried on the Keyser Quadrangle. This work is being carried out by Dr. William MacDonald of WVU. The chemicals used will be evaluated as to the effectiveness of the control in Oak Wilt.

No serious accidents or injuries occurred in F. Y. 1976.

PILOT PROJECT

Five Year Modified Control Appraisal Study

This program was initiated in 1969 as a cooperative effort between the United States Department of Agriculture, Forest Service and the West Virginia Department of Agriculture. The purpose of this study is to determine the effectiveness of deep girdle control and its relation to the long distance spread of oak wilt fungus (Ceratacystis fagacearum) disease. The study areas consisted of ten, fifteen minute quadrangles, each covering an area of 232 square miles. Five of the quadrangles are located in the southern part of the state and the other five in the northeastern panhandle region.

A pilot project was then set up for a study in 1973 using pressure injections of Cacodylic Acid, a herbicide with certain insecticidal properties, on two quadrangles (Hanging Rock and Moorefield). An additional study using copper sulfate was done on the Keyser quadrangle. Eight oak wilt diseased trees were injected with copper sulfate and two additional trees injected with water to serve as checks. Two copper sulfate treated trees were cut the following day after treatment and the remaining trees cut at three and four week intervals. The cut trees were sectioned and cultured to attempt recovery of the oak wilt fungus Ceratocystis fagacearum. Seventy percent of the fungi could be found from the cultured trees cut the day after treatment. The oak wilt fungus could not be recovered from the remaining trees.

Apparently after the copper sulfate had time to distribute itself throughout the tree, it caused the death of the oak wilt fungus.

A root graft experiment was being conducted in the Hanging Rock quadrangle. A dye transfer injection with oak wilt fungus spores were selected on thirty "center" trees with seven plus compatible oaks within fifty feet. By the end of the 1973 season, injections showed that ten percent of the trees were root grafted.

In the 1974 season Potassium iodide, copper sulfate and a combination of copper sulfate and cacodylic acid solutions were injected in oak wilt trees in the Keyser quadrangle. Later in the season the diseased trees were cut and cultured. From fifty to eighty percent of the oak wilt fungus had been reduced. These reductions were compared against non-treated diseased oaks. The dye transfer injections done in 1973 on the Hanging Rock quadrangle had a forty percent root grafts by the end of the 1974 season.

In the 1975 season Dr. William MacDonald carried out experiments in the Keyser quadrangle using injected chemicals Tordon 155, Velpar, Potassium Iodide and Diesel Fuel spray. Out of seven chemicals tested, three of the chemicals held some promise. They are Potassium Iodide, Velpar, and Tordon 155. In the bioassay of bolewood from randomly selected trees, the recovery of Ceratacystis fagacearum was reduced approximately 65%, 35%, and 25%. By the end of the 1975 season the root grafts had a thirty percent occurrence. In the Hanging Rock, Moorefield quadrangles selected trees were treated with Cacodylic Acid. This chemical is the most promising of the chemicals used, and will be used in the future.

During 1976, Dave Crock used Cacodylic Acid for injections for a future study. Dr. William MacDonald introduced three new injection types. They are three fungi Schizophyllum commune, Trichoderma viride, and Gliocladium roseum which were injected into diseased oaks. The oaks were later sampled and specimens cultured to determine if the three fungi did inhibit the oak wilt organism.

For a comparison study, a table has been included showing progress of the Five Year Modified Control Appraisal Study. Elk Garden and Greenland Gap are used as check quadrangles along with Hanging Rock, Moorefield and Keyser as injection quadrangles.

The oak wilt pilot project has come a long way in the past four years, and more information on the study areas will be circulated.

MOOREFIELD INJECTION QUADRANGLES - 4 - 7 1/2 MINUTE QUADRANGLES

	<u>1973</u> <u>TOTAL</u> <u>TREES</u>	<u>1973</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1974</u> <u>TOTAL</u> <u>TREES</u>	<u>1974</u> <u>TOTAL</u> <u>CENTERS</u>
MOOREFIELD	13	25	33	21
OLD FIELDS	43	37	36	36
SECTOR	25	17	35	20
NEEDMORE	<u>10</u>	<u>8</u>	<u>21</u>	<u>16</u>
TOTAL	99	87	131	100

	<u>1975</u> <u>TOTAL</u> <u>TREES</u>	<u>1975</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1976</u> <u>TOTAL</u> <u>TREES</u>	<u>1976</u> <u>TOTAL</u> <u>CENTERS</u>
MOOREFIELD	27	21	22	13
OLD FIELDS	30	22	26	15
SECTOR	25	17	25	18
NEEDMORE	<u>18</u>	<u>9</u>	<u>13</u>	<u>8</u>
TOTAL	100	69	86	54

HANGING ROCK INJECTION QUADRANGLES - 15 MINUTE QUADRANGLES

	<u>1973</u> <u>TOTAL</u> <u>TREES</u>	<u>1973</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1974</u> <u>TOTAL</u> <u>TREES</u>	<u>1974</u> <u>TOTAL</u> <u>CENTERS</u>
HANGING ROCK	99	74	90	70

	<u>1975</u> <u>TOTAL</u> <u>TREES</u>	<u>1975</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1976</u> <u>TOTAL</u> <u>TREES</u>	<u>1976</u> <u>TOTAL</u> <u>CENTERS</u>
SPRINGFIELD	28	22	16	13
LEVELS	10	10	12	8
AUGUSTA	15	12	12	8
HANGING ROCK	<u>9</u>	<u>8</u>	<u>9</u>	<u>8</u>
TOTAL	62	52	49	37

ELK GARDEN CHECK QUADRANGLES - ALL 7 1/2 MINUTE QUADRANGLES

	<u>1973</u> <u>TOTAL</u> <u>TREES</u>	<u>1973</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1974</u> <u>TOTAL</u> <u>TREES</u>	<u>1974</u> <u>TOTAL</u> <u>CENTERS</u>
ANTIOCH	98	69	109	80
WESTERN PORT	12	11	30	21
MOUNT STORM	2	1	4	4
KITZMILLER	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	112	81	143	105

	<u>1975</u> <u>TOTAL</u> <u>TREES</u>	<u>1975</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1976</u> <u>TOTAL</u> <u>TREES</u>	<u>1976</u> <u>TOTAL</u> <u>CENTERS</u>
ANTIOCH	77	51	94	53
WESTERN PORT	19	11	17	11
MOUNT STORM	1	1	0	0
KITZMILLER	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	97	63	111	64

GREENLAND GAP CHECK QUADRANGLES - 4 - 7 1/2 MINUTE QUADRANGLES

	<u>1973</u> <u>TOTAL</u> <u>TREES</u>	<u>1973</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1974</u> <u>TOTAL</u> <u>TREES</u>	<u>1974</u> <u>TOTAL</u> <u>CENTERS</u>
GREENLAND GAP	13	9	17	12
MEDLEY	44	29	32	21
MAYSVILLE	84	33	101	34
RIG	<u>17</u>	<u>13</u>	<u>21</u>	<u>18</u>
TOTAL	158	84	171	85

GREENLAND GAP CHECK QUADRANGLES - 4 - 7 1/2 MINUTE QUADRANGLES

	<u>1975</u> <u>TOTAL</u> <u>TREES</u>	<u>1975</u> <u>TOTAL</u> <u>CENTERS</u>	<u>1976</u> <u>TOTAL</u> <u>TREES</u>	<u>1976</u> <u>TOTAL</u> <u>CENTERS</u>
GREENLAND GAP	7	7	11	8
MEDLEY	28	21	45	32
MAYSVILLE	79	32	90	30
RIG	<u>37</u>	<u>32</u>	<u>28</u>	<u>18</u>
TOTAL	151	92	174	88

PILOT PROJECT

FIVE YEAR MODIFIED CONTROL APPRAISAL STUDY

<u>YEAR</u>	<u>INJECTIONS HANGING ROCK</u>		<u>CHECK GREENLAND GAP</u>		<u>CHECK ELK GARDEN</u>		<u>INJECTIONS MOOREFIELD</u>	
	<u>TOTAL TREES</u>	<u>TOTAL CENTERS</u>	<u>TOTAL TREES</u>	<u>TOTAL CENTERS</u>	<u>TOTAL TREES</u>	<u>TOTAL CENTERS</u>	<u>TOTAL TREES</u>	<u>TOTAL CENTERS</u>
1957	26	21	22	17	41	25	12	11
1958	76		56		78		47	
1959	80	139	131	97	198	127	137	89
1960	97	67	73	44	127	78	133	78
1961	103	68	64	41	59	28	65	37
1962	106	69	99	63	76	41	138	72
1963	111	74	193	122	172	99	220	136
1964	109	77	158	92	128	78	169	114
1965								
1966								
1967	98	70	99	58	61	45	129	83
1968	114	64	170	85	124	56	102	67
1969	105	78	195	96	111	71	217	135
1970	73	48	135	53	109	59	69	54
1971	119	76	349	131	326	121	215	136
1972	83	60	232	116	112	84	120	101
1973	99	74	158	84	112	81	99	87
1974	90	70	171	85	143	105	131	101
1975	62	52	151	92	97	63	100	69
1976	49	37	174	88	111	64	86	54